THE FEDERAL PLAN FOR METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH
FISCAL YEAR 2006
EXECUTIVE SUMMARY

For Fiscal Year (FY) 2006, the President's budget requests a total of $3.37 billion for meteorological services and supporting research. Of the requested total, $2.99 billion is designated for operations and $386 million for supporting research. Table ES-1 lists a breakout of the FY 2006 budget proposal.

For FY 2006, 92.8 percent of the total funds requested will go to the Departments of Commerce (DOC), Defense (DOD), and Transportation (DOT). The distribution among these three departments is DOC 57.2 percent, DOD 20.5 percent, and DOT 15.1 percent. The other Federal agencies will share the remaining 7.2 percent.

By comparison, the FY 2006 request represents an increase of 3.1 percent above the $3.27 billion appropriated in FY 2005. Within the three major departments, DOC requests an increase of 5.2 percent; DOD an increase of 0.7 percent, and DOT an increase of 4.4 percent. The DOC increase is attributable to requests for increases by NWS and NESDIS. The overall DOD increase is mainly the result of increases in AF and Navy requested funding. DOT's 4.4 percent increase is largely attributable to an increase in FAA's and FRA's operations requests.

The budget requests for the other departments are as follows:

- Department of Agriculture (USDA) a decrease of 15.8 percent,
- Department of the Interior (DOI) no change,
- Environmental Protection Agency (EPA) no change,
- National Aeronautics and Space Administration (NASA) a decrease of 7.5 percent, and
- the Nuclear Regulatory Commission (NRC) no change.

Figure ES-1 depicts each agency's proportion of the requested FY 2006 Federal budget for meteorological operations and supporting research. Each agency's portion of the requested funding for meteorological operations is shown in Figure ES-2. Of the $2.98 billion requested for meteorological operations, DOC, DOD, and DOT account for slightly over 98.5 percent of the funds. Overall, operational costs increased by 4.7 percent. Figure ES-3 depicts each agency's portion of the proposed Federal supporting research budget. Unlike operations, DOC, DOD, and NASA account for the major share (84.0 percent) of the supporting research budget. Other requests for supporting research funds are: a decrease in NASA (7.6 percent), a decrease in DOT (6.5 percent); an increase in DOD (12.1 percent); a decrease in DOC (16.0 percent); and no change at EPA.

All agencies project a personnel total of 16,365 full-time equivalent (FTE) to be employed in Federal meteorological operations in FY 2006. This figure represents a decrease of 0.5 percent from the 16,444 FTE employed in FY 2005.

Table ES-1. Federal Budget for Meteorological Operations and Supporting Research, FY 2006 (in thousands of dollars)

Agency	Operations	% of TOTAL	Supporting Research	% of TOTAL	TOTAL	% of TOTAL
Agriculture	$15,535	0.5	$28,280	7.3	$43,815	1.3
Commerce	1,839,769	61.6	89,939	23.3	1,929,708	57.2
Defense	619,646	20.7	71,803	18.6	691,449	20.5
Homeland Security	25,020	0.8	0	0.0	25,020	0.7
Interior	2,400	0.1	0	0.0	2,400	0.1
Transportation	483,450	16.2	24,506	6.3	507,956	15.1
EPA	0	0.0	9,000	2.3	9,000	0.3
NASA	2,615	0.1	162,600	42.1	165,215	4.9
NRC	120	0.0	0	0.0	120	0.0
TOTAL	$2,988,555*	100.0	$386,128	100.0**	$3,374,683*	100.0**

* Column total does not equal the same figure in Table 2.1 due to rounding.
** Column total does not exactly equal 100 percent due to rounding for several agencies.

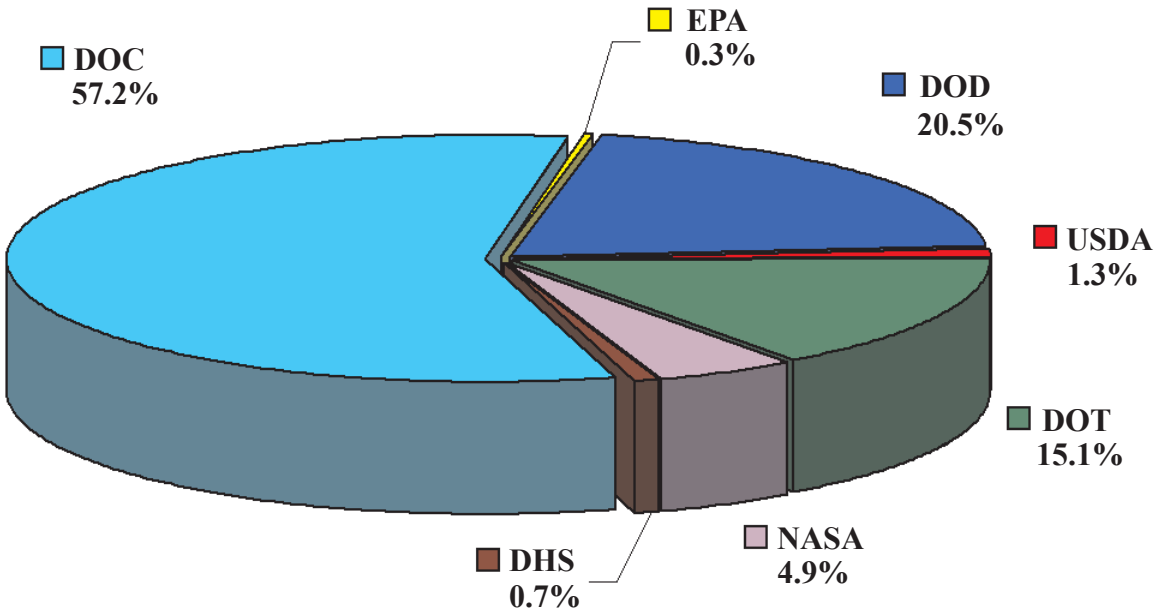

Figure ES-1. Agency Percent of Total Federal Budget for Meteorological Operations and Supporting Research, FY 2006.

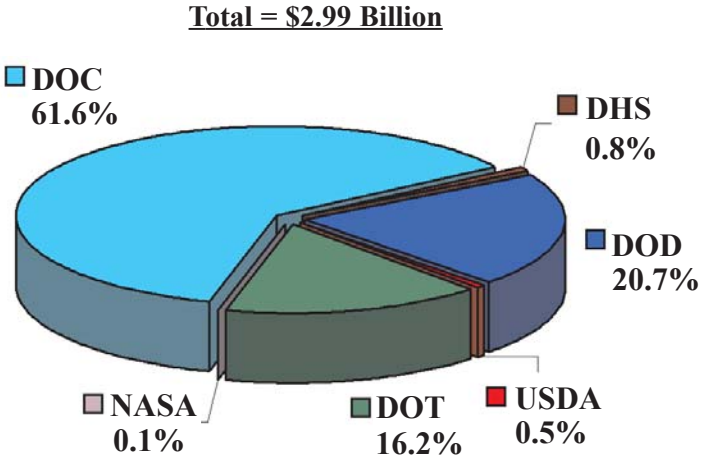

Figure ES-2. Agency Percent of Federal Budget for Meteorological Operations, FY 2006.

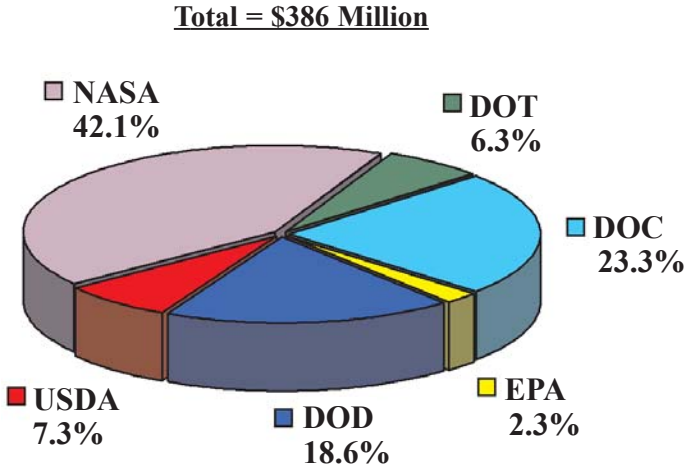

Figure ES-3. Agency Percent of Federal Budget for Supporting Research, FY 2006.

MAJOR PROGRAMS--DOC, DOD, and DOT

NEXT GENERATION WEATHER RADAR (NEXRAD).

The NEXRAD Program which began in FY 1981 was responsible for procurement, installation, and operation of the Weather Surveillance Radar-1988 Doppler (WSR-88D). The first limited production WSR-88D system was installed at Oklahoma City, Oklahoma in May 1990, and commissioned in February 1994. The original program plan called for a total of 161 radars. In response to a National Research Council report, three additional radars were added and raised the total to 164 radar sites.

By agency, as of June 2001, the DOC/National Weather Service had commissioned 123 sites, the DOD (USAF and Army) had commissioned 32 sites (within the states and overseas), and the DOT/FAA had commissioned 12 sites. DOD has three systems at Keesler AFB, Mississippi, for training; DOC/NWS has one each at the National Reconditioning Center, and NWS Training Center in Kansas City, Missouri and at the Radar Operations Center, Oklahoma City, Oklahoma.

AUTOMATED SURFACE OBSERVING SYSTEM (ASOS).

The ASOS program began in 1983, as a joint development effort between the DOC, DOD, and DOT/FAA. Installation of ASOS units started in 1992. A total of 1,002 units have been purchased. The NWS has purchased, accepted, and commissioned 313 sites. The FAA has purchased 570 units, all of which have been accepted and commissioned by the NWS. The Navy has purchased and accepted 72 sites. The Air Force has purchased and accepted 47 sites. Collectively, a total of 1,002 ASOS sites have been commissioned.

AUTOMATED WEATHER INFORMATION SYSTEMS (AWIS).

The DOC, DOD, and DOT require AWIS to facilitate the collection, processing, and interpretation of meteorological data. AWIS are being procured to provide an automated, high-speed, user-friendly man/machine interface to access and process large volumes of sophisticated meteorological data. AWIS supports the timely production of accurate and geographically precise warnings, forecasts, and special tailored products. They also provide the communications capability for expeditious product dissemination.

Major agency systems classified as AWISs are: NOAA's Advanced Weather Interactive Processing System (AWIPS), FAA's Weather and Radar Processor (WARP); Air Force's Joint Environmental Toolkit (JET); and the Navy's Naval Integrated Tactical Environmental Subsystem (NITES).

Advanced Weather Interactive Processing System (AWIPS).

In February 1997, the Secretary of Commerce approved the limited deployment of AWIPS at over 40 sites. On April 9, 1998, the Secretary authorized full-scale production and deployment of AWIPS, through Build 4.2, for the remaining 95 systems. Installation of these 95 systems began in September 1998 and was completed in June 1999. An Operational Test and Evaluation of the commissioning software load (Release 4.2) was successfully conducted from mid-May through June 1999. AWIPS commissioning began in January 2000 and, currently the NWS has commissioned all 139 operational AWIPS systems located at 122 Weather Forecast Offices (WFOs), 13 River Forecast Centers (RFCs), the Spaceflight Meteorology Group (SMG), and 4 National Centers for Environmental Prediction (NCEP).

The NWS successfully completed the final development phase release of AWIPS (Build 5) in early 2003, completed deployment of its first Operational Build (OB1) that summer, completed deployments of Operational Build 2 (OB2) in December 2003, Operational Build 3 (OB3) in August 2004, and Operational Build 4 (OB4) in February 2005. Deployment of Operational Build 5 (OB5) is planned to begin in June 2005. The Operational Builds continue to deliver new functionalities and enhancements in the areas of warning product generation and warning support, hydrological product generation, data and imagery display, communications and infrastructure. Of note within the operational builds of AWIPS is an evolution of the architecture to the Linux open source operating environment which was started in 2001, and will continue through to its planned completion in early 2007.

WARP.

The FAA's WARP will greatly enhance the dissemination of aviation weather information throughout the National Airspace System (NAS). WARP automatically creates unique, regional, WSR-88D-based, mosaic products, and sends these products, along with other time-critical weather information, to controllers through the Display System Replacement and to pilots via the Flight Information System. WARP underwent operational testing and evaluation in early FY 2003 and is operationally fielded at the 21 ARTCCs and the command center. Others systems used for enhancements, testing, and software support bring the total to 25 systems.

JET.

The Joint Environmental Toolkit (JET) will replace several disparate legacy weather systems with a single, integrated means of supporting both garrison and deployed operations, including a "first-in" weather forecasting capability. Combining forecasting, product-tailoring, and mission-impact capabilities in an interactive, network-

centric, standards-based package; JET accesses, processes, analyzes, tailors, and integrates terrestrial and space weather information into command and control systems to guide warfighter decision-making. This effort will eliminate Air Force Weather Weapon System (AFWWS) redundancies and inefficiencies, reduce the burden on system administrators, and ultimately extend, consolidate, or replace the following systems: Operational Weather Squadron (OWS) Production System Phase II (OPS II), the New-Tactical Forecast System (N-TFS), the Joint Weather Impacts System (JWIS), and the Army's Integrated Meteorological System (IMETS) weather toolkit.

NITES.

The Navy continued migration towards a modular, interoperable suite of systems to ingest, process, fuse, display, and disseminate METOC information and its impact on tactical operations. The current program consists of four seamless versions known as NITES Versions I-IV. NITES will be fielded through FY 2006. The NITES Version II Object Oriented Redesign (OOR) is the basis for the Joint METOC Segment of the new Global Command and Control System (GCCS) V4.0. Navy is reviewing options to field a follow-on system to NITES that would support naval tactical operations and be interoperable with the other services.

NATIONAL POLAR-ORBITING OPERATIONAL ENVIRONMENTAL SATELLITE SYSTEM (NPOESS)

The NPOESS Program began when Presidential Decision Directive (PDD) NSTC-2 established the Integrated Program Office (IPO) in October 1994. Under the terms of this PDD, the IPO's function is to "...reduce the cost of acquiring and operating polar-orbiting environmental satellite systems, while continuing to satisfy United States DOD and DOC operational requirements for data from these systems." Effectively, the directive combines the current operations and future follow-on activities of the DOD Defense Meteorological Satellite Program (DMSP) with the DOC National Oceanic and Atmospheric Administration (NOAA) Polar-orbiting Operational Environmental Satellite (POES) program. The new follow-on system is called NPOESS, and will be available to launch after the failure of the last operational DMSP or POES satellite, around 2010. Cooperation with foreign governments and international organizations is being nurtured.

NPOESS is an integrated DOC, DOD, and National Aeronautics and Space Administration (NASA) program. Through the IPO, DOC is responsible for operations and overall program management; DOD contracts are used for the acquisition of the satellites, launch vehicles, and associated ground systems; and NASA is responsible for insertion of new and innovative technologies.

The space segment of NPOESS will include space platforms and sensors that will collect and store environmental and other data. This data will be downlinked to a network of receptor sites around the world, which will immediately forward data via fiber optic communications to the Operational Weather Processing Centers (i.e. AFWA, FNMOC, NAVO, and NESDIS). This innovative data distribution scheme is projected to be at least 3 times faster than the required data latency of 90 minutes. The satellite will also provide continuous down-link of data to field terminals used by deployed/remote military units and civilian users to obtain environmental data. The space segment will consist of meteorological, oceanographic, terrestrial, space environmental monitoring, and climatic sensors, in addition to other systems such as surface data collection/location and search and rescue.

The NPOESS constellation will notionally consist of three satellites, which will fly at 833 ± 17 km altitude with an inclination of 98.7 ± 0.05 degrees in three distinct sun-synchronous orbits; early morning, midmorning, and early afternoon. A wide variety of sensors will be carried aboard these platforms to acquire imagery and other meteorological and environmental data.

Each satellite will carry several types of sensors to accomplish its mission: electrical/optical (E/O), microwave (MW), space environmental, and other specialized sensors. The E/O instruments include a Visible/Infrared Imager/Radiometer Suite (VIIRS) to provide imagery in the VIS and IR spectra, a Cross-track Infrared Sounder (CrIS), a passive IR sounder to provide high-resolution vertical profiles of atmospheric properties in conjunction with MW soundings, and an Ozone Mapping and Profiler Suite (OMPS) to measure ozone in the Earth's atmosphere. The microwave instruments include a NASA developed Advanced Technology Microwave Sounder (ATMS) to measure atmospheric temperature and water vapor profiles and a separate Conical Scanning Microwave Imager Sounder (CMIS), consisting of an imager and a supporting sounder, to measure the critical surface and atmospheric phenomena in the MW spectrum under "all weather" conditions. The space environmental sensor suite (SESS) will measure parameters such as electron density profiles, neutral density profiles, and charged particle energies. Other NPOESS instruments include NASA's Total Solar Irradiance Sensor (TSIS) to measure solar energy per unit time per unit area, and the Aerosol Polarimetry Sensor (APS) to retrieve specified aerosol and cloud parameters using multispectral photopolarimetry.

NPOESS will carry other payloads that are similar to existing instruments, such as the French-provided Data Collection System (DCS), which collects

and processes measurements from buoys, free-floating balloons, and remote weather stations, for on-board storage and subsequent transmission from the satellite, and the joint Canadian/French Search and Rescue Satellite Aided Tracking (SARSAT) system that uses NOAA satellites in low-Earth and geostationary orbits to detect and locate aviators, mariners, and land-based users in distress. The satellites relay distress signals from emergency beacons to a network of ground stations and ultimately to the United States Mission Control Center (USMCC) in Suitland, Maryland. The USMCC processes the data and alerts the appropriate search and rescue authorities.

Additionally, NPOESS will carry sensors such as the NASA Earth Radiation Budget Sensor and an altimeter. One of the CMIS missions is to use its polarimetric data to measure the ocean surface wind speed and direction, producing data that is comparable to the Advanced Scatterometer (ASCAT) being flown on EUMETSAT's Metop for ocean measurements (i.e. surface stress, surface wind, sea ice coverage).

FY 2003 was a very full year for NPOESS. The most significant activity of the year was the award of the contract to TRW (now Northrup Grumman Space Technology - NGST) at the end of 2002. Northrop is the prime contractor for the entire system, teamed with Raytheon to provide the Ground Segment portion. During FY 2003, the major focus was on completion of the VIIRS, CrIS, OMPS instruments and the command and control and data processing systems, all slated for first use on the joint IPO/NASA NPOESS Preparatory Project (NPP) satellite, slated for launch in the Spring, 2008.

In FY 2000, NASA and NOAA established the Joint Center for Satellite Data Assimilation (JCSDA) to facilitate the use of satellite environmental data by developing new and powerful mathematical techniques to assimilate the data into numerical weather prediction (NWP) models. The NPOESS program arranged for the DoD to participate in this effort, and the IPO is augmenting the JCSDA with funding to ensure NPOESS data is quickly accelerated into weather operations once it begins flowing.

In FY 2003 and early 2004, the NPOESS IPO and NASA completed arrangements with the Kingdom of Norway for installation of satellite C3 antennae on the island of Svalbard and fiber optic communications between the island and the Norwegian mainland. This provides redundant, reliable high volume communications for command and control and data retrieval. The site became operational in January 2004 and began taking data passes from the Navy's Coriolis/Windsat wind measurement satellite.

NPOESS also recently sponsored UCAR's (University Consortium for Atmospheric Research) Cooperative Program for Operational Meteorology, Education and Training (COMET) in branching into high-latitude territory. Since the usefulness of geostationary satellites declines rapidly at latitudes above 60 degrees north and south, NPOESS data are especially important toward the poles. COMET is developing a training series to orient forecasters to the products available from the polar orbiters. COMET is also developing material to help prepare forecasters for the data provided by the NPOESS series satellites.

The IPO is working with the NGST/Raytheon team on a daily basis to ensure ground systems are in place and operating in time for an NPOESS Preparatory Project (NPP) launch in the early 2008 timeframe and that all systems are ready for an expected 2011 NPOESS launch. In addition to DMSP and POES activities at NOAA's Satellite Operations Control Center (SOCC) in Suitland, Maryland, the operational side of the IPO will get busier with the additional responsibilities of WindSat Coriolis, NPP, and NPOESS over the next several years.

More information regarding the NPOESS program can be found at npoess.noaa.gov.

OTHER AGENCY PROGRAMS

For FY 2006, the Department of Agriculture (USDA) requested $43.8 million for meteorological operations and supporting research. Operationally, the USDA supports specialized weather observation networks and also conducts an active supporting research program to ensure an abundance of high-quality agricultural commodities, while minimizing the adverse effects of agriculture on the environment. Under supporting research, USDA focuses on the interactions of weather and climate with plant and animal production and water resources management.

The Department of the Interior's (DOI) FY 2006 request of $2.4 million is primarily to support the Bureau of Land Management's Remote Automatic Weather Station (RAWS) program.

The Environmental Protection Agency (EPA) budget request for FY 2006 is $9.0 million, the same amount as in FY-2005, to provide user-appropriate and scientifically credible air-quality and meteorological programs and models to support regulatory applications.

NASA’s FY 2006 request is for a total of $165.2 million--$2.6 million for operations and $162.6 million for supporting research. These funding levels are composed of the estimated meteorology share of the supporting research and analysis programs as well as Earth Observing System (EOS) and Earth Probe instruments, EOS science, and the EOS Data Information System elements of the NASA Office of Earth Science budget.

The Nuclear Regulatory Commission's (NRC's) request for $120,000 in FY 2006 is for operations. The NRC

will dedicate these funds to obtain and analyze meteorological data and information related to siting new nuclear power plants and safe operation of nuclear facilities, to the protection of public health and safety, and protection of the environment.

FEDERAL COORDINATION (See Appendix A for complete details.)

NATURAL DISASTER REDUCTION

Interdepartmental Hurricane Conference

The OFCM annually hosts the Interdepartmental Hurricane Conference (IHC) to provide a forum for the responsible Federal agencies, together with representatives of the user communities such as emergency management, to review the Nation's hurricane forecast and warning program and to make recommendations on how to improve the program. The OFCM hosted the 59th IHC in Jacksonville, Florida, March 7-11, 2005. The theme of the 2005 conference was *The Nation's Tropical Cyclone Program-Priorities for the Next Decade*. The conference attendance was 213; for the sixth consecutive year, attendance has exceeded 200. The 59th IHC was cohosted by the Office of the Oceanographer of the Navy. The keynote address for the conference was given by Dr. James R. Mahoney, Assistant Secretary of Commerce for Oceans and Atmosphere and NOAA Deputy Administrator. At its November 16, 2004, meeting, the Interdepartmental Committee for Meteorological Services and Supporting Research (ICMSSR) strongly supported the 58th IHC action item to develop a comprehensive strategy for tropical cyclone research and development to guide interagency efforts over the next decade. In response to that action, the Joint Action Group for Tropical Cyclone Research (JAG/TCR) was formed, and the group conducted a strategic planning session during the 59th IHC to begin developing the framework for a *Strategic Research Plan for Tropical Cyclones*. This effort will build upon the goals and objectives of the OFCM-sponsored *National Plan for Tropical Cyclone Research and Reconnaissance (1997-2002)* and the *U.S. Weather Research Program Hurricane Landfall Implementation Plan*, and articulate the interagency tropical cyclone research priorities for the next decade. The goal is to complete the plan prior to the 60th IHC in March 2006.

Post-Storm Data Acquisition

The OFCM will continue to coordinate, as required, timely post-storm data acquisition surveys in response to Presidentially declared natural disasters and other agency requirements to evaluate, for example, the impact on the coastal ecosystems. These natural disaster reduction efforts contribute to the determination of the intensity and magnitude of storms, and, in many cases, help to determine the extent of damage for use in Presidential disaster declarations. The additional data collected after hurricane landfall is also used in validating modeling efforts with both emergency management models (e.g., FEMA's HAZUS) and hurricane storm-surge models (e.g., NOAA's SLOSH). These models are used in real-time to assist decision makers in evacuation decisions and procedures. Post-storm data are also used to update FEMA Flood Insurance Rate Maps. In FY 2005, post-storm surveys were conducted for Hurricane Dennis; tornado occurrences during March in Houston County in Southeast Alabama, and in Seminole, Miller, and Mitchell Counties in Southwest Georgia; and Hurricane Katrina.

URBAN METEOROLOGY

The OFCM, in partnership with the Department of Homeland Security (DHS) Science and Technology Directorate, conducted a User Forum on Urban Meteorology, September 21-23, 2004, at the Doubletree Hotel and Executive Meeting Center in Rockville, Maryland. The theme of the forum was *Information to Improve Community Responses to Urban Atmospheric Hazards, Weather Events, and Climate*. It focused on the following elements of urban meteorology: severe weather, homeland security, air quality, water quality, and climate. This interagency forum was the direct result of an action item from the October 18, 2002, meeting of the FCMSSR. The forum's proceedings were completed in March 2005. In accordance with direction received at the November 16, 2004, meeting of ICMSSR, the OFCM developed clear guidelines and direction for establishing an interagency working group to address the actions that resulted from the forum.

CLIMATE

During FY 2005, the OFCM made contributions to climate activities in the following two primary areas: in connection with the Urban Meteorology User Forum which was held September 21-23, 2004, and the U.S. Climate Change Science Program (CCSP). The Urban Meteorology User Forum focused on the following elements of urban meteorology: severe weather, homeland security, air quality, water quality, and climate. Results of the forum were briefed at the November 16, 2004, meeting of the ICMSSR and, as a result, OFCM was tasked to develop clear guidelines and direction for establishing an interagency working group to address actions from the forum, and to coordinate and develop an interagency document covering an urban meteorology program, including climate. Dr. James R. Mahoney, Director of the U.S. Climate Change Science Program, briefed the FCMSSR at its December 1, 2004, meeting. Dr. Mahoney noted that

many challenges lie ahead for the CCSP program, particularly those related to the budget process and delivering the best possible science to inform decision makers. It was decided that FCMSSR members will continue to stay abreast of the CCSP and will coordinate priorities for atmospheric requirements through OFCM for inclusion in the CCSP.

OPERATIONAL PROCESSING

The OFCM Committee for Operational Processing Centers (COPC) addresses processing and backup capabilities of NOAA's National Centers for Environmental Prediction and Office of Satellite Data Processing and Distribution, the Air Force Weather Agency, and the U.S. Navy's Fleet Numerical Meteorology and Oceanography Center and Naval Oceanographic Office. During FY 2005, the COPC continued to make progress in areas such as model development, observing strategies, database architecture, and backup requirements.

The COPC has begun activities in the area of High Performance Computing and Communications (HPCC). An HPCC model run was conducted on the Weather Research and Forecasting (WRF) Operational Test Bed Distributed Center computers to demonstrate the capability of grid computing and to establish the feasibility of a DOD Joint Operational Test Bed for the WRF modeling framework.

At the March 23-24, 2005, meeting of the COPC, the members endorsed the establishment of a new OFCM-sponsored National Operational Processing Centers (NOPC) Program Council for higher level organizational approval and monetary commitment.

ENVIRONMENTAL SUPPORT TO HOMELAND SECURITY

Atmospheric Transport and Diffusion Research and Development Plan

In September 2004, the OFCM completed work with applicable agencies in developing the report, *Federal Research Needs and Priorities for Atmospheric Transport and Diffusion Modeling*, a FCMSSR action. The report is the result of a process that included consultation with subject-matter experts, including first responders and emergency managers; a careful analysis of research needs and current capabilities to respond to domestic incidents of national significance; a capability gap analysis; and the development of strategies to close the gaps. The report was briefed to the ICMSSR and FCMSSR at their November 16, 2004, and December 1, 2004, meetings, and both committees endorsed the report's recommendations.

On July 19, 2005, the OFCM conducted a special session in conjunction with the 9th Annual George Mason University (GMU) Conference on *Atmospheric Transport and Dispersion Modeling* to begin to address, with the broader private and academic communities, the issue of uncertainty in ATD models-a capstone goal of the *Federal Research Needs and Priorities for Atmospheric Transport and Diffusion Modeling* report. In addition, the OFCM developed an ATD implementation strategy for the report's recommendations for which the OFCM has primary responsibility. The strategy was sent to the FCMSSR and ICMSSR members in August 2005 for their review and comments.

George Mason University Atmospheric Transport and Dispersion Modeling Conference

George Mason University (GMU), Fairfax, Virginia, conducted its 9th Annual Conference on *Atmospheric Transport and Dispersion Modeling*, July 18-20, 2005. The OFCM partnered with GMU to sponsor the event.

On July 19, 2005, the OFCM hosted a session related to the OFCM's ongoing work with the Department of Homeland Security and other members of the Federal meteorological community. The main focus of the ongoing work was to define the concept of operations and the research and development needs required to support the National Incident Management System and emergency responders at Federal, state, and local levels. The OFCM session topic was *Uncertainty in Atmospheric Transport and Diffusion (ATD) Models*. The Federal Coordinator noted that the session objectives were to facilitate a discussion of uncertainties in ATD modeling systems that incorporates academic and private sector inputs, and accounts for uncertainty in meteorological observations and models and in dispersion models; and to help Federal agencies striving to improve their ATD modeling systems to implement the recommendations made by the OFCM JAG for Atmospheric Transport and Diffusion (Research and Development Plan) in their publication *Federal Research and Development Needs and Priorities for Atmospheric Transport and Diffusion Modeling (2004)*. He also stated that the way ahead included: complete the strategy for ATD modeling improvements and present it to the FCMSSR (key elements of the strategy are a core set of ATD modeling systems, recovery of existing ATD data, common framework for model evaluation, and ATD test beds); and through partnership and collaboration within the Federal meteorological community and its customers, the OFCM will continue to identify shortfalls in urban meteorology, and help to organize improvements across all applicable focus areas that will better support users in the urban environment. On August 26, 2005, the OFCM *Implementation Strategy for Federal Atmospheric Transport and Diffusion Modeling and Measurement Improvements* was forwarded to the FCMSSR members.

Homeland Security Environmental Support Plan

The *Homeland Security Environmental Support Plan*, an action from the FCMSSR, will define the mission, roles, and responsibilities of individual Federal agencies as they relate to homeland security and will document each agency's environmental support capabilities and/or requirements. The OFCM worked closely with the Plume Modeling Subset of the Consequence Management, Site Restoration/Cleanup (CMS) Subgroup, which is chaired by the Department of Homeland Security (Emergency Preparedness and Response), to develop an interagency concept of operations for an all-hazards dispersion support framework. The concept of the Interagency Modeling and Atmospheric Assessment Center (IMAAC) was successfully proposed to the Homeland Security Council Deputies and adopted in April 2004.

While the initial goal was to complete the *Homeland Security Environmental Support Plan* by the end of FY 2005, successful completion rests with the completion of the IMAAC concept of operations, which, at this point, is still evolving.

ANNUAL FEDERAL PLAN

In October 2004, the OFCM issued *The Federal Plan for Meteorological Services and Supporting Research-Fiscal Year 2005*. The Federal Plan is congressionally mandated and is a one-of-a-kind document which articulates the meteorological services provided and supporting research conducted by agencies of the Federal government. The Federal Plan helps to reduce overlap and duplication among the agencies. It is a comprehensive publication that documents proposed programs for Fiscal Year (FY) 2005 and reviews agency programs in FY 2004. The plan demonstrates to the Congress and to the Executive Branch how the Federal agencies work together to accomplish their missions in an effective and efficient manner. The special interest article in the FY 2005 Annual Federal Plan, *The Rewards of Managing Weather-Related Risks*, focused on the Federal agencies' meteorological activities related to risk management and assessments, and the socioeconomic impacts of natural hazards.

WEATHER INFORMATION FOR SURFACE TRANSPORTATION

The ICMSSR received an update on weather information for surface transportation (WIST) at its November 16, 2004, meeting. The ICMSSR supported the Working Group for Weather Information for Surface Transportation (WG/WIST) actions to allow all Federal departments and agencies to participate in the development of plans or projects to meet their WIST needs and ensure Federal resources are used efficiently; to develop a multiyear, Federal WIST research program plan to bring together the Federal weather and surface transportation research communities and provide a vision for the public and private sectors to use for planning purposes; and to develop an overarching, multiagency-coordinated WIST implementation program.

The work of the WG/WIST, jointly chaired by NOAA and FHWA, was endorsed in the July 20, 2005, Memorandum of Understanding signed by VADM Conrad C. Lautenbacher, Jr., USN (Ret.) and Ms. Mary E. Peters. Timely and accurate surface transportation information will support improvements in safety and efficiency in transportation operations.

Most recently, on September 23, 2005, OFCM forwarded to ICMSSR members the *Weather Information for Surface Transportation (WIST) Initiative Document-First Steps to Improve the Nation's WIST Capabilities and Services* (September 2005). This Initiative Document represents the initial recommendations of the WG/WIST members on key actions and priorities that should be taken by the responsible agencies in the OFCM Federal coordinating infrastructure to collaborate on and address national surface transportation safety, mobility, and productivity issues.

AVIATION WEATHER

In December 2004, the OFCM issued *Aviation Weather Programs/Projects-2004 Update* which updates the compilation of activities across Federal agencies that began with the *National Aviation Weather Initiatives Final Baseline Tier ¾ Report*, distributed in 2001, and serves as a baseline report for the recently established Joint Planning and Development Office (JPDO) within the Federal Aviation Administration (FAA).

This report updates and extends the analysis of trends in weather-related aviation accidents that first appeared in the *National Aviation Weather Program Mid-Course Assessment*, published in August 2003, and endorsed by the FCMSSR, FAA, and the National Center for Atmospheric Research (NCAR). The effort to deliver improved weather risk reduction products and services must be supported and sustained.

Additional accomplishments which are underway in the area of aviation weather support include follow-up activities from the June 21-24, 2004, *2nd International Conference on Volcanic Ash and Aviation Safety*. These include the development and coordination of interagency volcanic ash operations and implementation plans. The operations plan will identify procedures and agency responsibilities and contacts for responding to a volcanic ash release. The implementation plan will provide the roadmap for further improved science, new technologies for observing volcanic ash (e.g., NASA's efforts), improved detection (USGS), NOAA modeling and forecasting (NAAC forecasts for aircraft avoidance), and education of the inter-

national community.

SPACE WEATHER

The overarching goal of the *National Space Weather Program* (NSWP), which is administered by an OFCM program council, is to achieve an active, synergistic, interagency system; providing timely, accurate, and reliable space weather warnings, observations, specifications, and forecasts by 2007. The *NSWP Strategic and Implementation Plans* provide, respectively, broad guidance and a detailed roadmap for the NSWP. It was noted at the November 16, 2004, and December 1, 2004, ICMSSR and FCMSSR meetings, respectively, that the program is nearing the end of the 10-year period, which was addressed in the strategic and implementation plans, and that it was time to perform an interagency assessment to look at the progress toward meeting its goals. It was determined that a comprehensive review of the NSWP was warranted to quantify the progress toward meeting the goals in observations, research, modeling, transition of research to operations, and education and outreach; to determine if actions detailed in the *NSWP Implementation Plan* are on target and moving in the direction detailed by the strategic plan; and to determine whether the strategic goals should be adjusted at this time based on emerging and evolving requirements. A National Space Weather Program Assessment Study Group has been formed and the strategy for completing the assessment completed.

On September 27, 2005, an Interim Assessment Letter Report was sent to the Federal Coordinator and forwarded to FCMSSR members. The report contained early findings and areas where further investigation will take place.

PHASED ARRAY RADAR

The Phased Array Radar Project (PARP) was briefed to ICMSSR at its November 16, 2004, meeting. The ICMSSR supported the JAG's continued work to identify and document the potential needs and benefits that the phased array radar and an adaptive radar sensing strategy would address, and to integrate those identified needs into a multiagency-coordinated research and development (R&D) plan that would focus R&D efforts on meeting each agency's needs. The plan will also prioritize the most pressing R&D needs and provide a roadmap to address those needs within the OFCM coordinating infrastructure. A summary report was distributed to ICMSSR members in early October 2005; and the final multiagency-coordinated R&D plan will be completed by January 2006.

ATMOSPHERIC RESEARCH AND DATA ASSIMILATION/DATA MANAGEMENT

Atmospheric research and data assimilation/data management were challenges and issues discussed at the November 16, 2004, and the December 1, 2004, meetings of ICMSSR and FCMSSR, respectively. It was noted that there was a need to tie future research efforts in science, technology, and transition mechanisms to operational and societal requirements. It was agreed that agencies will support research and development needs and requirements based on agency priorities and will continue to identify issues and concerns that are necessary for the development of capabilities required to realize societal benefits. Agencies will also support and facilitate opportunities for the transition of research into operational applications. Further comments and suggestions will be provided by the agencies to the Federal Coordinator to assist OFCM in the planning and development of a vision and implementation roadmap for the supporting research enterprise of the Federal meteorological community for the next decade.

Also highlighted at the ICMSSR and FCMSSR meetings were data assimilation and data management challenges the community faces, as the size of future data sets increase by orders of magnitude. Advanced modeling and data assimilation techniques are critical to improve the quality of analyses and model results and to maximize the value of the Global Earth Observation System of Systems (GEOSS). Agencies were very supportive of the need for further interagency collaboration efforts in this area. An action item stemming from the FCMSSR meeting was that Federal requirements and capabilities in key areas, like data management and data assimilation, need to be surveyed and further addressed. This interagency work fully supports NOAA's crosscutting priorities.

In response to the above FCMSSR action item, the OFCM undertook a survey of Federal requirements and capabilities in the area of meteorological data assimilation and related data management. On September 15, 2005, the OFCM provided to FCMSSR and ICMSSR members an interim survey/assessment progress report on its efforts; the final report which will examine the gaps in our current data assimilation/data management capability, articulate the challenges that lie ahead in meeting future requirements, and propose a strategy to address these gaps in capability and future challenges, will be completed during January 2006.

COLLABORATION WITH NAS/NRC BOARD ON ATMOSPHERIC SCIENCES AND CLIMATE

The OFCM continued its mutually beneficial interactions with the National Academy of Sciences/National Research Council (NAS/NRC). The NAS/NRC Board on Atmospheric Sciences and Climate (BASC) conducted a planning meeting on June 21, 2005, to discuss *Mesoscale Observation Networks for Meeting Multiple National Needs.* In this plan-

ning meeting in which the Federal Coordinator for Meteorology was a participant, a small group of people were asked to brainstorm about a general issue that has been identified as a potential study topic. The Federal Coordinator helped BASC to better define the issue and identify whether an Academy study on the topic would be valuable. The Federal Coordinator noted that the multitude of meteorological impacts on the urban environment alone would warrant the proposed BASC study, and that all five primary focus areas within urban meteorology (severe weather, homeland security, air quality, water quality, and climate) discussed during the *Forum on Urban Meteorology-Meeting Weather Needs in the Urban Community*, conducted by OFCM, September 21-23, 2004, would benefit from improved mesoscale and urban scale observational capabilities. The Federal Coordinator provided a detailed listing of possible study tasks and, also, identified potential sources of observational needs and current capabilities information.

COLLABORATION WITH THE COMMITTEE ON ENVIRONMENT AND NATURAL RESOURCES

CENR Principals

The Federal Coordinator continues to be a participant on the Committee on Environment and Natural Resources (CENR), and continues to assist CENR through review and concurrence of CENR reports and materials.

Subcommittee on Disaster Reduction

The OFCM has been an active participant in the work of the CENR Subcommittee on Disaster Reduction (SDR). Recognizing that disasters can be the result of a technological and/or natural hazard, the subcommittee changed its name from the Subcommittee on Natural Disaster Reduction to the Subcommittee on Disaster Reduction (SDR). Recently, the focus of this group has been to enhance disaster resilience by composing a 10-year agenda for science and technology activities that will produce a dramatic reduction in the loss of life and property from natural and technological disasters. This 10-year agenda identifies a suite of Grand Challenges for disaster reduction. It cuts across all hazards and disaster management stages and identifies priorities for research and investment. Addressing these Grand Challenges will improve the Nation's capacity to prevent and recover from disasters. OFCM is committed to working with SDR to provide a forum for information sharing, development of collaborative opportunities, and interactive dialogue with the U.S. policy community to advance informed strategies for managing risks associated with natural and technological disasters. The Grand Challenges document will contribute to U.S. government planning activities on a number of levels, especially in the area of enhancing the Nation's safety and economic well-being.

AMERICAN METEOROLOGICAL SOCIETY

During FY 2005, the OFCM joined leading environmental science and service corporations in supporting undergraduate scholarships in the atmospheric and related oceanic and hydrologic sciences. The scholarships, awarded for the junior and senior years, are designed to encourage outstanding undergraduates to pursue careers in the fields covered by the awards. The OFCM plans to continue this support.

The OFCM also supports American Meteorological Society (AMS) endeavors by participating in AMS conferences and workshops and other environmental science education and outreach programs. The OFCM staff cochaired the *21st AMS Conference on Weather Analysis and Forecasting* held in Washington, D.C., August 1-5, 2005. In addition, the Federal Coordinator participated in three important AMS-sponsored activities including: the *AMS Corporate Forum* on March 31, 2005, in the Washington, D.C. area, at which he gave a cross-agency and international perspective on GOES-R rebroadcast; *The Future of the U.S. Weather Prediction Enterprise*, July 26-28, 2005, in Boulder, Colorado; and the *Golden Jubilee Symposium*, September 20-21, 2005, in Research Triangle Park, North Carolina, where he served as the session chair for the role of air quality models in decision making.

INTERNATIONAL SUPPORT

The Federal Coordinator provided a comprehensive briefing on the OFCM and interagency coordination of Federal meteorological activities to Dr. Xu Xiaofeng and a delegation of 25 individuals from the Chinese Meteorological Administration, on May 24, 2005.

Then on August 24, 2005, the Federal Coordinator hosted and briefed Dr. Zheng Guoguang, Deputy Administrator of the Chinese Meteorological Administration. Also, news media from Japan attended and conducted interviews at the 59th Interdepart-mental Hurricane Conference in Jacksonville, Florida, March 7-11, 2005.